CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME II

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IMPROVEMENT OF EXTRACTION PROCESSING CONDITIONS FOR ANTIBACTERIAL COMPOUNDS FROM *Curcuma longa*

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ABSTRACT

Curcuma longa is a rhizomatous herbaceous perennial plant of the ginger family, Zingiberaceae that is known for its antibacterial property. In this study optimization of extraction processing conditions were determined to obtain maximum yield of antibacterial compounds from *C. longa*. Optimization experiments designed by Box-Behnken (Design Expert Software) were carried out with three parameters considered namely agitation, extraction time and temperature. Analysis of results was done statistically using Analysis of Variance (ANOVA). The regression equation analysis showed that the optimum condition in producing antibacterial compound was 40°C of temperature, 24 hour and at 150 rpm agitation speed gave the maximum diameter of zone inhibition (19.17 mm). The analysis showed that the model ($p < 0.01$) is significant for inhibiting the bacterial activity.

Keywords: extraction, antibacterial activity, *Curcuma longa*, Box-Behnken

INTRODUCTION

Extraction is a process in which two phases come into contact with the objective of transferring a solute or particle from one phase to the other. It usually comes early in purification process for a bioproduct and typically would precede a high resolution step. There are two common methods of extraction known as liquid-liquid extraction and solid liquid extraction (Harrison *et al*, 2003). In this study, solid liquid extraction was used and conditions for extraction are optimized to obtain high yield of product at reduced time and cost. The product that was extracted in the present study was antibacterial compounds and the starting material was *Curcuma longa*. *C. longa* was chosen as it has been long proven to possess antibacterial activity and has been proven safe to consume as it was used in daily cooking. The plant is a good candidate for the source of antibacterial drug with minimal side effects.